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ANIMAL HEALTH SCIENCE RESEARCH ADVISORY BOARD

1978 ANNUAL REPORT

UNITED STATES
DEPARTMENT OF
AGRICULTURE

SCIENCE AND
EDUCATION
ADMINISTRATION

JANUARY 1979

ANIMAL HEALTH SCIENCE RESEARCH ADVISORY BOARD
1978 ANNUAL REPORT

United States Department of Agriculture
Science and Education Administration

EXECUTIVE SUMMARY

Agricultural appropriations for fiscal year 1979 provide \$15 million for new programs in animal health and disease research under the Food and Agriculture Act of 1977. This appropriation has given a high degree of urgency and importance to the activation of the Animal Health Science Research Advisory Board (authorized under Subtitle E, Public Law 95-113) and to the actions of this Board. Recommendations made by the Board to the Secretary for implementing these new programs of animal health research are summarized in this report.

Current Situation in Animal Health

Livestock commodity groups continually express concerns to the Department over the \$4.6 billion annual animal health losses and inadequacies of efforts to reduce these losses. Current alarm over pseudorabies in swine, brucellosis in cattle, contagious equine metritis in horses and African swine fever now in this hemisphere are examples of new major concerns. Reduction of livestock disease losses through research represents an investment rather than a cost due to the very profitable cost-benefit ratios possible. This research benefits both consumers and producers through increased supplies of animal products, at less cost and greater safety for the consumer, improved predictability in animal production and in wholesomeness of animal products, reduced damage to the environment, reduced wasted energy resources, and increased export potential of disease-free products.

Expectations of the New Animal Health Research Programs

Funding limitations and funding mechanisms in the past have not permitted strong Federal support for intensive animal health research programs in the veterinary colleges and State agricultural experiment stations. The Food and Agriculture Act of 1977 (Public Law 95-113, Subtitle E) however, addressed the national concern for animal health research and authorized significant new programs which would reverse the downward decline of this nation's capacity to deal with animal health problems. These new programs will involve some of the nation's most highly trained and experienced veterinary scientists. Formula provisions of the Act (Section 1433) will allocate funds to the States in accordance with each State's livestock importance and the capacity to do research as measured by the support for animal health and disease projects and the number of State scientists. Funding thus provided, and continuing appropriations in the future, should help make possible the research continuity, critical scientific mass, and systems approaches necessary to solve a portion of the complex animal health and disease problems. Such prerequisites have not been readily attainable at the previous low-level and intermittent funding available in the past.

Activities of the Advisory Board

The Animal Health Science Research Advisory Board, authorized under Subtitle E of Public Law 95-113, worked very intensively in 1978 to advise the Secretary on implementing Subtitle E. Two meetings of the Board were held during the year (August 15-16 and October 26-27), which permitted decisions to be made on the numerous questions related to Subtitle E implementation.

Specific Recommendations

Details of Board recommendations are described in the body of the report. Major actions and recommendations are:

(a) Priorities

Specific high priority diseases of livestock and poultry were identified by the Board in consultation with national commodity organizations. These priorities will be of major assistance to the Department in setting its priorities and in the placement of FY 1979 Grants (\$10 million) in animal health and disease research.

(b) Disease Reporting System

The Department should develop a national system for reporting specific causes and levels of livestock and poultry losses. Such information is essential in establishing accurate priorities for animal disease research.

(c) Definition of Animal Health and Disease

A definition developed by the Board describes the scope of animal health and disease research. Emphasis is to be placed on solution of disease problems.

(d) Research Capacity

Animal health research capacity should be measured by funds and scientist-years devoted to food animal (and horse) disease research in eligible institutions.

(e) Section 1434 Implementation

Sixty to 70 percent of any funds appropriated under this Section should be centered on disease problems of regional importance and the balance on national problems. Regional Committees should recommend to the Board priorities and proposals seeking to solve these problems. Peer panels should review these proposals for technical adequacy.

(f) Research Coordination

Although desirable, two or more eligible institutions existing within a single State need not establish a single officer responsible for Subtitle E programs. Plans and proposed programs of each such institutions should be reviewed by the other(s) to assure proper coordination and communication.

(g) Fiscal Year 1979 Funds

FY 1979 funds (\$5 million) appropriated for Section 1433 and/or 1434 should be utilized under Section 1433. Special Grant supplementary funding of Section 1433 funds not to exceed a combined total of \$50,000 should be made to appropriate States to permit adequate programs of animal disease research. FY 1979 Special Grant funds (\$10 million) should be used entirely for animal health and disease research and fund research on livestock commodities in relation to their importance.

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1. Introduction

(a) Current Situation in Animal Health

In the production of food animals one of the major risks faced by the producer is the possibility of substantial loss of animals due to diseases, parasites or other causes. Fifteen to 20 percent of food animals die before reaching market. These losses, plus the growth inefficiencies and treatment costs in animals that recover from illnesses, result in an annual financial loss of over \$4.6 billion.

Modern production practices require large numbers of animals in closely confined conditions. This greatly enhances risks of disease. Disease agents are continually changing. Increased concern over the environment and product safety has reduced livestock management alternatives, e.g., in disposing of wastes or in using feed additives in disease prevention. Research is needed to determine if potential hazards of drugs and pesticides are real or imagined. In some cases, practical, effective measures are limited or lacking for serious livestock and poultry health problems. Alternate methods of control need to be developed. There is current, widespread concern over pseudorabies in swine and brucellosis in cattle. Foreign animal diseases pose a greatly increased hazard with present-day international air transportation of people, animals, and animal products. During the past year a foreign disease, contagious equine metritis, was found to be present for the first time in the United States. During this same year, the dreaded swine disease, African swine fever, crossed the Atlantic Ocean to appear and spread in Brazil and the Dominican Republic.

From an overall viewpoint, diseases reduce efficiency in the production of food animals. Although livestock producers individually must initially absorb disease losses, collectively the anticipated level of losses are passed on to the consumer as one of the costs of producing animal products. In the nation's long-term outlook these losses will have even greater critical importance in terms of wasted energy resources (feed and other energy requiring production inputs), and in limiting capacity to meet expanding national and international population requirements for high quality protein.

(b) Animal Health Research Benefits

Strong interest is continually expressed by livestock commodity groups in the need for more intensive research to solve animal health problems. This interest is understandable in view of direct savings which such research has achieved. Recent examples include the following:

A 10-year research investment of \$16.4 million resulted in the world's first widely applied, successful, commercial vaccine--one which effectively controls Marek's disease of poultry. Annual savings in Marek's disease losses now amount to \$170 million annually from the vaccine.

A commonly used test (fluorescent antibody) was adapted at minimum cost to detect hog cholera. With the aid of the test, this disease has been eradicated from the United States, resulting in annual savings of \$50 million.

A research investment of about \$7 million was made by the USDA in 1965-1972 on the cause and potential human hazard of leukemia in cattle. Within this 7-year period the viral cause of the disease had been determined. A test had been developed indicating the disease is not the same as leukemia in man, and pasteurization was shown to render milk safe. Public confidence in the safety of dairy products has been preserved by this research.

At a cost of \$100,000, a reliable diagnostic procedure was developed to distinguish Exotic Newcastle Disease from the widespread, less hazardous enzootic Newcastle Disease. This test permitted eradication of Exotic Newcastle Disease from California. This disease would now be costing the country about \$250 million a year if eradication had not been successful.

Recent studies on research needed to insure adequate future supplies of food have placed animal health in a position of high priority. One of the studies recommended a 50 percent increase in such research. Funds have not been available to meet these recommendations. Animal health research efforts at the State Agricultural Experiment Stations (SAES) have declined as much as 25 percent in the past 10 years. SAES and USDA funding limitations and funding mechanisms have made comparatively little use of a large pool of the nation's most highly trained, experienced and well-equipped scientists in colleges of veterinary medicine. Over the past decade, USDA funds annually have supported less than two full-time scientists in each of these colleges.

With their medical training and experience, scientists in the colleges of veterinary medicine have competed favorably for Federal grants to solve human health problems, using animals as experimental models.

(c) Current Support For Animal Health Research

Tables 1 and 2 show the 1977 levels and sources of support for animal health research in the SAES and for research in colleges of veterinary medicine. About 40 percent of the research in the veterinary colleges was agriculturally-oriented and 60 percent directed toward human health problems. The USDA supported 7.2 percent of the total research in these colleges. The Department provided support for 19.5 percent of the animal health research in the SAES. Some 4.9 percent of the SAES research expenditures in 1977 were on animal health problems, while 8.6 percent of the USDA's intramural research was centered in this area. The 1977 USDA intramural animal health research program involved 245.4 scientist years at a level of \$35,336,500.

If one examines the level of effort being given to plant protection research as related to total plant production research, it is obvious that animal protection research is not receiving the same comparative degree of attention as livestock production research. Comparative figures are shown in Table 3. In the SAES,

animal production comprises 21.5 percent of the total livestock production research funds, while plant protection makes up 37.9 percent of plant production research funds. In a similar comparison of USDA's intramural programs, animal protection emphasis (65.1 percent of animal production) exceeds that of plant protection (54.7 percent of plant production). This is due in part to the level of animal protection research centered on foreign animal diseases (about 2/3) and the extreme security and correspondingly high cost of this research. Also there is comparatively greater relative emphasis on domestic animal health than in the SAES. These comparisons substantiate the need for additional animal health research programs in the veterinary colleges and SAES.

2. New Animal Health Research Programs (Public Law 95-113, Subtitle E)

Public Law 95-113, Subtitle E, Animal Health and Disease Research, provides the legislative authorization needed by the Department to initiate new programs providing adequate extramural emphasis to animal health research. Formula provisions under Section 1433 provide unique opportunity to allocate funds to colleges of veterinary medicine and to SAES in line with the capacity of these institutions to conduct animal health research and in relation to the comparative importance of livestock in each State. A State matching requirement would enhance effectiveness of Federal support. Adequate funding thus provided would make possible the research continuity, critical scientific mass, and systems approaches necessary to solve complex animal health problems. Such prerequisites currently are generally unattainable at the low-level and intermittent extramural funding now available.

3. The Animal Health Science Research Advisory Board

The Animal Health Science Research Advisory Board is authorized under Subtitle E to advise the Secretary on implementation of this Subtitle and to recommend animal health and disease research priorities.

Subtitle E identifies specific institutional and commodity groups and Federal agencies to be represented on the Board. There are 11 members: 3 persons - national livestock and poultry organizations; 2 persons - State Agricultural Experiment Stations; 2 persons - Colleges of Veterinary Medicine; and 1 person each - Bureau of Veterinary Medicine, Food and Drug Administration; Animal and Plant Health Inspection Service, USDA; Agricultural Research, Science and Education Administration, and Cooperative Research, Science and Education Administration, USDA. Board members serve for a period of 5 years.

Secretary Bergland established a charter for the Board on February 6, 1978. As provided in the charter, the Board Chairman is the Assistant Secretary for Conservation, Research and Education. The Director of the Science and Education Administration is the Board's Vice-Chairman. Members of the Board are listed in APPENDIX I.

Although the Board has been authorized primarily to advise the Secretary on implementing Subtitle E, the Board also functions as a mechanism to help promote and strengthen interactions between the Department and the State research institutions and livestock commodity groups in animal health research.

Through the Board, the Department now has a formal mechanism for receiving animal health research advice from the Colleges of Veterinary Medicine, live-stock and poultry commodity groups and the State Agricultural Experiment Stations. Of additional importance is the opportunity, which the Board provides, for the interfacing of State research and research priorities with the research needs of animal health regulatory agencies in the Department (APHIS) and the Food and Drug Administration, Bureau of Veterinary Medicine. The Board held two meetings in 1978. The first was held on August 15-16, and the second on October 26-27. Both meetings were fully utilized in discussions, decisions, and development of recommendations on critical issues related to implementing Subtitle E.

4. Definition - Animal Health and Disease Research

Subtitle E authorizes new programs of "animal health and disease research," but other than what is indicated in Section 1429 (Purpose) does not define the scope of this research. The Board gave primary consideration to a definition developed by an ad hoc committee representing State Agricultural Experiment Stations and colleges of veterinary medicine. This definition was modified and accepted:

"Animal health and disease research" is defined as basic and applied studies on infectious, noninfectious, parasitic and chemical factors that: impair the normal state of the living animal body, that affect the performance of vital functions, that reduce the efficiency of production, or that endanger the suitability for human food of animals or animal products."

The Board recommended that research emphasis under Subtitle E should center on livestock diseases of high priority in order to concentrate research efforts and avoid dilution of funds. Department experience with the definition suggests that it may not be of sufficient clarity to prevent some confusion of production efficiency research with disease research. Further Board action on the definition may be needed.

5. Implementation of Subtitle E

The Agricultural Appropriation Bill for Fiscal Year 1979 includes \$5 million for distribution under Subtitle E, Section 1433 or 1434. The Science and Education Administration, after consultation with appropriate Congressional staff, determined that these funds could best be used under Section 1433. Cooperative Research, SEA, was designated to administer the program.

Section 1433

(a) Formula for Distribution of Funds

Formula provisions of this Section require distribution of funds to the States in accordance with their relative importance in livestock value and income and their relative standing in animal health research capacity. Further distribution of a State's allocation among eligible institutions within the State must be made on the basis of their animal health research capacity.

Section 1433 funds for Fiscal Year 1979 are being distributed by the following formula as required by the authorizing legislation and as further defined by the Board:

Livestock Value and Income

- 24% Livestock Value (USDA inventory data)
- 24% Livestock Income (USDA cash receipts data)

Research Capacity

- 24% Expenditures (FY 1977) for animal health research
- 24% Scientist-years (FY 1977) for animal health research
- 4% Department Administration

The distribution of Section 1433 funds for Fiscal Year 1979 is listed in Table 4.

(1) Livestock Value and Income

The Board recommended that livestock value and income be considered equally in distribution of Section 1433(b)(2) funds. Thus, 48 percent of these funds should be distributed as follows: 24 percent to States in accordance with their ranking in livestock value and 24 percent on the basis of their ranking in livestock income (cash receipts).

The Board recommended the use of a 3-year moving average for both livestock value and income. Livestock value amounts for all applicable species within a State should be aggregated in determining formula allocations. The same procedure should be used in formula calculations based on livestock income.

The Board has called attention to the need for more critical value and income data on all food animal species including aquaculture and other minor species. Concern was expressed that current USDA data on livestock value may not accurately reflect the value of breeding animals. A subcommittee was named to advise the Secretary on livestock data needs as related to the Section 1433 formula.

In response to inquiry by the Director, SEA, Department Legal Council has advised that only data on cattle, sheep, swine, poultry, and horses should be used on Section 1433 formula calculations. In the absence of up-to-date data on horses, Legal Council advised judicious use of that available.

(2) Animal Health Research Capacity

Subtitle E, Section 1433, requires that 48 percent of funds under this Section must be distributed to States on the basis of animal health research capacity of eligible institutions. Methods of determining this capacity are not specified.

The Board adopted a proposal made by the ad hoc committee mentioned previously:

Animal health research capacity should be determined by the animal health and disease research effort in eligible institutions as measured by Current Research Information System (CRIS) data on scientist-years and on level of funding for this research (exclusive of amounts received under Section 1433).

The Board delayed action on means of allocating Section 1433 funds to territories, possessions, or protectorates (District of Columbia, Guam, Puerto Rico, and the Virgin Islands) for which there is no USDA information on livestock value and income, but which may have eligible institutions. It was judged that a recommendation was not needed immediately in view of a Department decision to provide Special Grant funds to eligible institutions in certain States or protectorates to supplement Section 1433 funds.

Thus 48 percent of Section 1433 funds should be distributed as follows: 24 percent to States in accordance with their ranking in animal health and disease research scientist-years and 24 percent on the basis of their ranking in expenditures for this research (exclusive of Section 1433 funds).

At the request of Cooperative Research, SEA, a subcommittee of the Board was named to assist in reviewing and certifying animal health research capacity in eligible institutions.

Recommendations by the Board and limitations under the Purposes of Subtitle E as stated in Section 1429 restrict eligible research capacity principally to studies having clear and direct relationship to disease problems of livestock (including horses), poultry, and aquaculture species. Thus, research on production efficiency of food animals is not eligible unless clearly and directly related to correction of a disease condition. Also, excluded are diseases of pet animals (dogs, cats, etc.), humans and wildlife unless the research is clearly related to one of the purposes listed in Section 1429 or has clear and direct implications to food animal diseases.

The Board recommended that indirect costs could be included in expenditures listed under animal health research capacity. Capacity credit in time and salary equivalents should be allowed for full-time professional rank teaching staff conducting part-time research provided that the data are auditable and the research time is permitted under the institution's rules.

In determining distribution of FY 1979 Section 1433 funds, FY 1977 data were used by the Department as the most recent and complete information available for measuring animal health research capacity. This procedure and the definition of research capacity resulted in a general reinforcement of programs in animal health. Also it provided significant amounts of Federal formula funds for some Colleges of Veterinary Medicine that had not received such funds previously. New or recently established Colleges of Veterinary Medicine received limited or no allocations because their research capacity is in the stage of development. Substantial research capability in some other veterinary colleges could not be recognized as animal health research capacity due to its orientation toward human health, comparative medicine and companion animals.

(b) Maintenance of Viable Research Programs

In a letter dated September 27, 1978, Secretary Bergland indicated to Senator Melcher that Section 1433 funds for Fiscal Year 1979 would be supplemented by Special Grant or other funds to assure adequate levels of animal health research support to all States eligible to receive these funds. In regard to this commitment, the Board recommended that Special Grant funds for Fiscal Year 1979 be used to supplement formula funds so that no State having an eligible institution would receive less than \$50,000. This is believed to be the minimum level of Federal assistance needed to maintain a viable research program in animal health and disease research.

(c) Distribution of Funds Among States Participating in a Regional College of Veterinary Medicine

Section 1433(b) authorizes the Secretary to modify the method of distributing formula funds among States which jointly establish or support a regional college of veterinary medicine. Such a college may share in funds that would be due these States under the livestock value and income portion of the formula. The Board examined this provision and recommended that implementation be delayed. There does not appear to be special merit in this provision at present.

Section 1434

(a) Reasons for Non-Use (Fiscal Year 1979)

Section 1434 authorizes the Secretary to make grants for research on specific problems of regional and national importance. Congressional and Executive actions on agricultural appropriations for Fiscal Year 1979 made \$5 million available for distribution under this Section and/or Section 1433.

The Board recommended that none of these funds be used under Section 1434 in order to prevent undue diminution of Section 1433 funds to ineffective levels. Additionally, the availability in FY 1979 of \$10 million for Special Grants in animal health research will accomplish a substantial part of the intentions of Section 1434.

If funds are made available in the future under this Section, the Board recommended that distribution be made through a procedure in which not less than 60 percent nor more than 70 percent of Section 1434 funds would be used for research on problems of regional importance. The balance of funds would be used for research on problems of national importance. Regional committees established by and representing eligible institutions would provide advice on regional priorities. Research proposals on regional and national problems would be reviewed for technical adequacy by peer panels established by Cooperative Research, SEA.

6. Special Grants for Animal Health Research - Section 1414(c)(1),
Public Law 95-113

FY 1979 agricultural appropriations authorized \$10 million for animal health and plant science research, with principal emphasis on the former. The funds are to be used for Special Grants under Public Law 89-106 as amended by Public Law 95-113, Section 1414(c)(1). As mentioned previously, the Board recommended that a portion of these funds be used to supplement Section 1433 formula funds to provide a minimum of \$50,000 for animal health research in all eligible States. A total of \$505,756 in Section 1414(c)(1) funds was required for this purpose to supplement Section 1433 allotments in 17 States (Table 5). The Board recommended that the balance of funds be used for animal health research and that grants be made for research on livestock diseases in accordance with relative monetary importance of each species.

7. Research Priorities

A major purpose of the Board is to recommend to the Secretary research priorities in animal health and disease for implementation under Subtitle E. In order to carry out this charge, the Board requested national organizations representing livestock and poultry commodities to provide their recommendations on animal health research priorities. Excellent response was obtained from this request and the Board completed a list of problems in priority need of research. These priorities are listed in APPENDIX II.

The Board recommended that the major disease problems of livestock and poultry receive research attention in the following priority order:

1. Respiratory diseases
2. Enteric diseases
3. Reproductive diseases
4. Internal and external parasites

Other than the four major problems listed above, the Board declined to designate animal health and disease priorities across species, because it does not have adequate data to support such recommendations. The recommendations made should be reappraised and modified in future years, based on more adequate data. The Board strongly emphasized that the Department should develop and provide these data if accurate assessments of disease priorities are to be made.

8. Other Items

(a) Officers Responsible for Subtitle E Funds and Programs

The Board was asked to consider a requirement that a single official be charged with responsibility for Subtitle E funds and programs in cases where two eligible institutions exist on campus at a single university. The responsible official would be the Director of the Agricultural Experiment Station. Advantages are: (1) Better integration and coordination of animal health research; (2) Use of Station experience, capability and staff in management and accountability for Federal agricultural research funds; and (3) Avoidance of divisive approaches promoted by animal health programs under two separate administrators.

The Board recommended that in instances where two eligible institutions exist at the same university or in the same State, a single officer could be designated as responsible for Subtitle E funds and programs. This should be a local option and not a general requirement.

(b) Research Coordination Between Eligible Institutions in a State

Congress clearly intended for active and continuing coordination to occur between eligible institutions in each State conducting research under Subtitle E. To facilitate this coordination, to prevent duplication, and to promote complementary research within applicable States, SEA proposes to require joint review by the Station Director(s) and the Dean(s) of the Veterinary College(s) on all Annual Plans of Work and Projects proposed for funding under Subtitle E.

The Board recommended that research proposals and plans of an eligible institution should be reviewed by the responsible officer(s) of any eligible institution(s) in the State to facilitate coordination and cooperation and to avoid duplication.

(c) Need for Livestock Morbidity-Mortality Information

In discussions on the definition of animal health and disease research, there was agreement on the need for a national reporting system on animal disease losses. Decisions on research priorities require continuing accurate data on these losses.

The Board recommended that the Department seek implementation of a national morbidity-mortality reporting system for animal disease losses. The Board directed that the following statement be transmitted to the Secretary:

"The Board has been directed, as part of its overall responsibility, to establish a priority list of diseases for each species of food animal and equine that requires research; also, to establish a priority list of research needs that applies to each disease.

This will be done based on the data that are presently available, but in our discussion it has become obvious that a major flaw exists for the Board to give the Secretary of Agriculture more meaningful recommendations in the future. The flaw is the lack of a national animal morbidity/mortality reporting system that will reflect the prevalence of each disease and possibly its economic effect. Such information would be extremely important not only to those in research but to economists, budget analysts, business, etc.

The lack of such a reporting system has been recognized for a long time. Comprehensive studies by the National Academy of Sciences on the need and benefits of such a system have resulted in their recommendation that it be developed and implemented as soon as possible. In addition, different agencies of the U.S. Department of Health, Education, and Welfare and the U.S. Department of Agriculture have recommended the same, as well as the American Veterinary Medical Association.

The Board strongly recommends that the development and implementation of such a system be provided for by USDA in the 1980 budget or earlier if possible."

TABLE 1
SOURCES OF RESEARCH SUPPORT
COLLEGES OF VETERINARY MEDICINE
FY 1977

| <u>AGRICULTURAL RESEARCH</u> | <u>FUNDS</u> | <u>PERCENT OF TOTAL</u> |
|-------------------------------------|---------------------|-----------------------------|
| USDA | *\$ 2,625,000 | 7.2 |
| Other Federal | \$ 1,368,000 | 3.7 |
| Non-Federal | 10,550,000 | 28.8 |
| TOTAL | <u>\$14,543,000</u> | <u>39.7</u> |
| Scientist Years | **106 | |
| | | |
| <u>HUMAN HEALTH AND WELFARE</u> | | |
| USDA | none | 0 |
| Other Federal | \$19,231,000 | 52.5 |
| Non-Federal | 2,652,000 | 7.3 |
| TOTAL | <u>\$21,883,000</u> | <u>59.8</u> |
| | | |
| <u>NATURAL RESOURCES</u> | | |
| Other Federal | \$ 170,000 | 0.5 |
| TOTALS | \$ 36,596,000 | 100 |

* Include \$1.7 million USDA formula funds and Special Grants and \$830,000 in Cooperative Agreements and Contracts reported by the State Agricultural Experiment Stations (in Table 2).

**Not including scientist-years reported by the State Agricultural Experiment Stations.

TABLE 2

SOURCES OF SUPPORT FOR
ANIMAL HEALTH RESEARCH
STATE AGRICULTURAL EXPERIMENT STATIONS
FY 1977

| <u>USDA</u> | <u>FUNDS</u> | <u>PERCENT OF TOTAL</u> |
|---------------------------|----------------------|-------------------------|
| Cooperative Research, SEA | * \$ 4,728,000 | 15.6 |
| Other USDA | * <u>1,185,000</u> | <u>3.9</u> |
| TOTAL USDA | \$ 5,913,000 | 19.5 |
| Other Federal | \$ 2,647,000 | 8.7 |
| State Appropriations | 17,326,000 | 57.0 |
| Sales of Products | 1,884,000 | 6.2 |
| Industry | 1,541,000 | 5.0 |
| Other | <u>1,085,000</u> | <u>3.6</u> |
| TOTAL | Funds - \$30,396,000 | 100 |
| Scientist-Years - | 328 | |

* Includes \$1,700,000 formula and Special Grant funds channeled to the colleges of veterinary medicine via the State Agricultural Experiment Stations and \$830,000 in Cooperative Agreements and Contracts with these colleges reported by the SAES.

TABLE 3

RELATIVE SUPPORT FOR PROTECTION RESEARCH
IN TOTAL PLANT OR ANIMAL PRODUCTION RESEARCH
FY 1977

| | <u>**SAES</u> | <u>USDA</u> | <u>USDA-SAES</u> |
|-------------------|---------------|-------------|------------------|
| Animal Protection | 21.5% | 65.1% | 34.1% |
| *Plant Protection | 37.9% | 54.7% | 43.1% |

* Excluding forestry research

**State Agricultural Experiment Stations, schools of forestry, and other cooperating institutions

UNITED STATES DEPARTMENT OF AGRICULTURE
Science and Education Administration
Cooperative Research

FISCAL YEAR 1979 - Distribution of Funds to Eligible Institutions
Authorized Under Public Law 95-113, Section 1433, September 29, 1977

| State and Institution | Section 1433 Formula Funds | Matching Offset Required |
|---|-------------------------------|-----------------------------|
| ALABAMA | | |
| Agricultural Experiment Sta. | 85,549 | 19,886 |
| Auburn Univ., Sch. Vet. Med. | 14,681 | 3,412 |
| Tuskegee Inst., Sch. Vet. Med. | 30,054 | 6,986 |
| ALASKA | | |
| Agricultural Experiment Sta. | 8,016 | 0 |
| ARIZONA | | |
| Agricultural Experiment Sta. | 54,156 | 0 |
| ARKANSAS | | |
| Agricultural Experiment Sta. | 68,868 | 0 |
| CALIFORNIA | | |
| Agricultural Experiment Sta. | 59,844 | 37,854 |
| Sch. of Vet. Med. | 212,292 | 134,282 |
| COLORADO | | |
| Agricultural Experiment Sta. and Col. of Vet. Med. | 124,800 | 24,800 |
| CONNECTICUT | | |
| Agricultural Experiment Sta. | 11,928 | 0 |
| DELAWARE | | |
| Agricultural Experiment Sta. | 11,148 | 0 |
| FLORIDA | | |
| Agricultural Experiment Sta. | 76,232 | 0 |
| Col. of Vet. Med. | 12,052 | 0 |
| GEORGIA | | |
| Agricultural Experiment Sta. | 43,330 | 15,309 |
| Col. of Vet. Med. | 111,302 | 39,323 |
| HAWAII | | |
| Agricultural Experiment Sta. | 7,752 | 0 |

| | | | |
|------------------------------|---|---------|---|
| IDAHO | : | : | : |
| Agricultural Experiment Sta. | : | 58,175 | : |
| Col. of Vet. Med. | : | 23,845 | : |
| | : | | : |
| ILLINOIS | : | : | : |
| Agricultural Experiment Sta. | : | 56,076 | : |
| Col. of Vet. Med. | : | 124,620 | : |
| | : | | : |
| INDIANA | : | : | : |
| Agricultural Experiment Sta. | : | 8,381 | : |
| Sch. of Vet. Med. | : | 104,695 | : |
| | : | | : |
| IOWA | : | : | : |
| Agricultural Experiment Sta. | : | 30,634 | : |
| Col. of Vet. Med. | : | 250,322 | : |
| | : | | : |
| KANSAS | : | : | : |
| Agricultural Experiment Sta. | : | | : |
| and Col. of Vet. Med. | : | 157,716 | : |
| | : | | : |
| KENTUCKY | : | : | : |
| Agricultural Experiment Sta. | : | 91,668 | : |
| | : | | : |
| LOUISIANA | : | : | : |
| Agricultural Experiment Sta. | : | 87,973 | : |
| Col. of Vet. Med. | : | 4,127 | : |
| | : | | : |
| MAINE | : | : | : |
| Agricultural Experiment Sta. | : | 17,316 | : |
| | : | | : |
| MARYLAND | : | : | : |
| Agricultural Experiment Sta. | : | 56,469 | : |
| Johns Hopkins Univ. | : | 14,499 | : |
| | : | | : |
| MASSACHUSETTS | : | : | : |
| Agricultural Experiment Sta. | : | 19,440 | : |
| | : | | : |
| MICHIGAN | : | : | : |
| Agricultural Experiment Sta. | : | | : |
| and Col. of Vet. Med. | : | 138,120 | : |
| | : | | : |
| MINNESOTA | : | : | : |
| Agricultural Experiment Sta. | : | 44,062 | : |
| Col. of Vet. Med. | : | 123,770 | : |
| | : | | : |
| MISSISSIPPI | : | : | : |
| Agricultural Experiment Sta. | : | | : |
| and Col. of Vet. Med. | : | 56,712 | : |
| | : | | : |
| MISSOURI | : | : | : |
| Agricultural Experiment Sta. | : | | : |
| and Col. of Vet. Med. | : | 130,920 | : |
| | : | | : |

| | | | |
|------------------------------|---|---------|--------|
| MONTANA | : | : | : |
| Agricultural Experiment Sta. | : | 91,956 | : |
| | : | | 0 |
| NEBRASKA | : | : | : |
| Agricultural Experiment Sta. | : | 147,648 | : |
| | : | | 47,648 |
| NEVADA | : | : | : |
| Agricultural Experiment Sta. | : | 28,620 | : |
| | : | | 0 |
| NEW HAMPSHIRE | : | : | : |
| Agricultural Experiment Sta. | : | 16,512 | : |
| | : | | 0 |
| NEW JERSEY | : | : | : |
| Agricultural Experiment Sta. | : | 26,004 | : |
| | : | | 0 |
| NEW MEXICO | : | : | : |
| Agricultural Experiment Sta. | : | 39,264 | : |
| | : | | 0 |
| NEW YORK | : | : | : |
| Agricultural Experiment Sta. | : | 24,734 | : |
| Col. of Vet. Med. | : | 181,522 | : |
| | : | | 12,742 |
| | : | | 93,514 |
| NORTH CAROLINA | : | : | : |
| Agricultural Experiment Sta. | : | 117,576 | : |
| | : | | 17,576 |
| NORTH DAKOTA | : | : | : |
| Agricultural Experiment Sta. | : | 58,764 | : |
| | : | | 0 |
| OHIO | : | : | : |
| Agricultural Experiment Sta. | : | 86,789 | : |
| Col. of Vet. Med. | : | 56,227 | : |
| | : | | 26,104 |
| | : | | 16,912 |
| OKLAHOMA | : | : | : |
| Agricultural Experiment Sta. | : | 130,158 | : |
| Col. of Vet. Med. | : | 4,002 | : |
| | : | | 33,141 |
| | : | | 1,019 |
| OREGON | : | : | : |
| Agricultural Experiment Sta. | : | 44,287 | : |
| Sch. of Vet. Med. | : | 47,045 | : |
| | : | | 0 |
| | : | | 0 |
| PENNSYLVANIA | : | : | : |
| Agricultural Experiment Sta. | : | 60,428 | : |
| Lehigh Univ. | : | 2,549 | : |
| Sch. of Vet. Med. | : | 62,399 | : |
| | : | | 12,230 |
| | : | | 516 |
| | : | | 12,630 |
| PUERTO RICO | : | : | : |
| Agricultural Experiment Sta. | : | 7,164 | : |
| | : | | 0 |

| | | | |
|------------------------------|---|---|-------------|
| RHODE ISLAND | : | : | |
| Agricultural Experiment Sta. | : | : | 0 |
| | : | : | |
| SOUTH CAROLINA | : | : | |
| Agricultural Experiment Sta. | : | : | 0 |
| | : | : | |
| SOUTH DAKOTA | : | : | |
| Agricultural Experiment Sta. | : | : | 1,676 |
| | : | : | |
| TENNESSEE | : | : | |
| Agricultural Experiment Sta. | : | : | |
| and Col. of Vet. Med. | : | : | 0 |
| | : | : | |
| TEXAS | : | : | |
| Agricultural Experiment Sta. | : | : | |
| and Col. of Vet. Med. | : | : | 262,604 |
| | : | : | |
| UTAH | : | : | |
| Agricultural Experiment Sta. | : | : | 0 |
| | : | : | |
| VERMONT | : | : | |
| Agricultural Experiment Sta. | : | : | 0 |
| | : | : | |
| VIRGINIA | : | : | |
| Agricultural Experiment Sta. | : | : | |
| and Col. of Vet. Med. | : | : | 0 |
| | : | : | |
| WASHINGTON | : | : | |
| Agricultural Experiment Sta. | : | : | 2,520 |
| Col. of Vet. Med. | : | : | 5,012 |
| | : | : | |
| WEST VIRGINIA | : | : | |
| Agricultural Experiment Sta. | : | : | 0 |
| | : | : | |
| WISCONSIN | : | : | |
| Agricultural Experiment Sta. | : | : | 76,148 |
| | : | : | |
| WYOMING | : | : | |
| Agricultural Experiment Sta. | : | : | 0 |
| | : | : | |
| SUBTOTAL | : | : | |
| | : | : | 4,800,000 |
| | : | : | |
| Federal Administration | : | : | |
| | : | : | 200,000 |
| | : | : | |
| TOTAL | : | : | |
| | : | : | \$5,000,000 |

TABLE 5
ANIMAL HEALTH AND DISEASE RESEARCH
SUPPLEMENTAL FUNDING
FY 1979

| | Section 1433 Formula Funds | P.L. 89-106 |
|----------------|----------------------------------|--------------|
| Alaska | \$ 8,016 | \$41,984 |
| Connecticut | 11,928 | 38,072 |
| Delaware | 11,148 | 38,852 |
| Hawaii | 7,752 | 42,248 |
| Maine | 17,316 | 32,684 |
| Massachusetts | 19,440 | 30,560 |
| Nevada | 28,620 | 21,380 |
| New Hampshire | 16,512 | 33,488 |
| New Jersey | 26,004 | 23,996 |
| New Mexico | 39,264 | 10,736 |
| Puerto Rico | 7,164 | 42,836 |
| Rhode Island | 12,684 | 37,316 |
| South Carolina | 25,704 | 24,296 |
| Utah | 34,476 | 15,524 |
| Vermont | 16,752 | 33,248 |
| West Virginia | 17,652 | 32,348 |
| Wyoming | <u>43,812</u> | <u>6,188</u> |
| TOTAL | \$344,244 | \$505,756 |

APPENDIX I
ANIMAL HEALTH SCIENCE RESEARCH ADVISORY BOARD
MEMBERSHIP LIST

ANDERSON, David P.
Dean, College of Veterinary Medicine
University of Georgia
Athens, Georgia 30602
Phone: (404) 542-3461

BERTRAND, Anson R. (Vice Chairman)
Director
Science & Education Administration
U.S. Department of Agriculture
Washington, D.C. 20250
Phone: (202) 447-3801

CUTLER, M. Rupert (Chairman)
Assistant Secretary for Conservation,
Research and Education
U.S. Department of Agriculture
Washington, D.C. 20250
Phone: (202) 447-2796

EGAN, James
North Bangor, New York 12966
Phone: (518) 483-3658

GARNER, Marvin J.
Executive Vice-President
National Pork Producers Council
4715 Grand Avenue
Des Moines, Iowa 50312
Phone: (515) 277-6419

HOEFER, Jacob A.
Associate Director
Michigan State University
East Lansing, Michigan 48824
Phone: (517) 355-0123

HUBER, William G.
Associate Dean
College of Veterinary Medicine
Washington State University
Pullman, Washington 99164
Phone: (509) 335-6622

KERSTING, Edwin J.
Director
University of Connecticut
Storrs, Connecticut 06268
Phone: (203) 486-2917

MULHERN, Francis J.
Administrator
Animal & Plant Health Inspection
Service
U.S. Department of Agriculture
Washington, D.C. 20250
Phone: (202) 447-3668

NORCROSS, Marvin A.
Acting Associate Director for Res.
Bureau of Veterinary Medicine
Food & Drug Administration
Room 7-57 Parklawn Building
5600 Fishers Lane
Rockville, Maryland 20857
Phone: (301) 443-3450

PURCHASE, H. Graham
Science and Education Administration
Agricultural Research
Room 428-W.
U.S. Department of Agriculture
Washington, D.C. 20250
Phone: (202) 447-5121

SPLITTER, Earl J.
(Executive Secretary)
Group Leader, Animal Sciences
Cooperative Research, Science and
Education Administration
U.S. Department of Agriculture
Washington, D.C. 20250
Phone: (202) 447-5007

WALDRIP, William J.
General Manager, Spade Ranches
Post Office Box 2763
1107½ Avenue K
Lubbock, Texas 79408
Phone: (806) 765-8537

APPENDIX II

Recommendations on Animal Health and Disease Research Priorities by the Animal Health Science Research Advisory Board

October 26-27, 1978

General Priorities (Livestock and Poultry Commodities)

1. Respiratory diseases
2. Reproductive diseases
3. Enteric diseases
4. Parasitic diseases

Commodity Priorities

A. Beef Cattle

1. Respiratory and shipping fever complex
2. Reproductive diseases (especially infectious abortions and infertilities)
3. Parasitic infections (both internal and external, including gastrointestinal worms, coccidia, and biting arthropods)
4. Infectious enteric diseases (neonatal and feeder calf diarrhea)
5. Blue-tongue
6. Exotic diseases (i.e., foot and mouth disease)
7. Anaplasmosis
8. Foot rot

B. Dairy Cattle

1. Mastitis
2. Reproductive diseases - including metritis complex, abortion, ovarian dysfunction, heat detection, and leptospirosis
3. Respiratory diseases in calves and young animals
4. Digestive diseases - including calf scours and winter dysentery
5. Metabolic diseases - including milk fever and ketosis
6. Parasites - including internal and external parasites
7. Blue-tongue
8. Anaplasmosis
9. Musculo-skeletal diseases - including hoof rot, arthritis, and lump jaw
10. Leukosis

C. Swine

1. Enteric diseases of baby pigs
2. Mastitis-metritis-agalactia
3. Respiratory diseases
4. Swine dysentery
5. Transmissible gastroenteritis

D. Chickens

1. Respiratory diseases such as mycoplasmosis, Newcastle, and bronchitis, colibacillosis
2. Mycotoxicosis
3. Enteric diseases, such as salmonellosis and coccidiosis
4. Adenovirus infections including egg drop syndrome
5. Viral arthritis and other leg problems
6. Marek's disease and lymphoid leukosis
7. Fowl cholera
8. Internal and external parasites

E. Turkeys

1. Respiratory diseases such as mycoplasmosis, influenza, Newcastle disease, colibacillosis, and ornithosis
2. Systemic diseases such as pasteurellosis and adenovirus infections
3. Skeletal problems including mycoplasmosis, osteomyelitis, and nutritional disorders
4. Natural toxins including mycotoxins
5. Enteric diseases such as hemorrhagic enteritis, salmonellosis, coccidiosis, blue-comb
6. Erysipelas
7. Transmissible neoplasms
8. Internal and external parasites

F. Sheep

1. Predator control
2. Respiratory diseases (especially progressive pneumonia)
3. Enteric diseases including parasites
4. Multistrain blue-tongue vaccine
5. Poisonous plants including photosensitization
6. Regional soremouth vaccines (need to develop proper strains)
7. Foot rot
8. Drug clearance for minor species
 - a. Wormers, liver fluke treatment
 - b. Monensin, rumensin

G. Goats

1. Abscesses
2. Mycoplasma diseases
3. Abortion diseases
4. Johne's disease
5. Mastitis

H. Horses

1. Contagious equine metritis
2. Laminitis
3. Parasites
4. Respiratory diseases
5. Strangles
6. Abortion/sterility caused by viral and bacterial infections
7. Heaves and tying up syndrome
8. Equine infectious anemia
9. Colic